# FREETOWN HIGHWAY DEPARTMENT

TOWN BARN • 201 CHACE ROAD
EAST FREETOWN, MASS. 02717

CHARLES J. MACOMBER
HIGHWAY SURVEYOR

TOWN BARN
(508) 763-2359


May 30, 2013

**TOWN OF FREETOWN – INVITATION TO BID**
**ROADWAY MATERIALS/SERVICES – FY 2014**

The Freetown Highway Department, pursuant to Mass. General Laws Ch. 30, §39M, hereby solicits bids for the following items for Fiscal Year 2014: Winter sand, highway salt, road striping, crack sealing, bituminous concrete in place, cold planing, cold patch, and stone seals. Materials shall meet MassHighway specifications. When applicable, vendors shall be in compliance with prevailing wage laws.

In order to more effectively manage its projects the town has determined that bituminous concrete and cold planning will be awarded as one. The low bidder will be determined by calculating the total anticipated cost of the project.

Specifications are available online at http://www.freetownma.gov/

Sealed bids marked "Roadway Materials/Services" will be accepted at the Selectmen's Office, P. O. Box 438, 3 North Main Street, Assonet, MA 02702, until Friday, June 28, 2013, at 11:00 a.m. Bids will be publicly opened and read at the Town Administrator's office, address above, on that date at 11:15 a.m.

The Town of Freetown reserves the right to reject any or all bids and to accept the bids deemed most advantageous to the Town.

FREETOWN HIGHWAY DEPARTMENT

Charles J. Macomber
Highway Surveyor

**SPECIFICATIONS/BID FORMS FOR**
**HIGHWAY DEPARTMENT ROADWAY MATERIALS/SERVICES**
**FISCAL YEAR 2014**

The Freetown Highway Department will receive bids on the materials/services listed below to be used for Town roadways. The Town of Freetown reserves the right to reject any or all bids and to accept the bid deemed most advantageous to the Town.

All materials shall conform to the specifications of the Massachusetts Highway Department. Asphalt shall conform to A.S.T.M. Standards, and specifications may be obtained by contacting the Highway Surveyor, Charles J. Macomber, at the Freetown Highway Department, 201 Chace Road, East Freetown, Mass., or by telephone at (508) 763-2359. Vendors shall conform with Mass. General Laws, Chapter 149, Sections 27 to 27G, and submit all necessary documents. Prevailing wage rates shall apply to applicable work.

Other bid forms to be completed are the Hold Harmless Statement, Certificate of Payment of Taxes, and Certification of Non-Collusion.

Sealed bids marked "Roadway Materials/Services" will be accepted at the Selectmen's Office, P. O. Box 438, 3 North Main Street, Assonet, MA 02702, until Friday, June 28, 2013, at 11:00 a.m. Bids will be publicly opened and read at the Town Administrator's office, address above, on that date at 11:15 a.m. The bids shall be for the Fiscal Year 2014 (July 1, 2013 through June 30, 2014).

**SPECIFICATIONS FOR TREATED STONE SEALS**

## 1. DEFINITIONS

The term Director shall mean the Highway Surveyor of the awarding authority.

The term Designee shall mean an employee of the awarding authority, designated by the Director.

The term Contractor shall mean a professional company contracted by the awarding authority to perform work under this agreement.

## 2. DESCRIPTION

Work under this contract shall consist of the Contractor furnishing and applying liquid asphalt and treated stone on properly prepared bituminous streets. Bid quantities are approximate only; payment shall be for actual quantities applied to streets. Streets to be stone sealed shall be selected by the Contractor and the Director or his/her Designee.

## 3. MATERIALS

a. Liquid Asphalt

Liquid asphalt grades shall be: CRS-2 (3% Latex), CMS-2 (3% Latex), RS-2 (3% Latex), HFMS-2 (3% Latex) or MC-3000 conforming to AASHTO specifications M208, M140 or M82.

b. Latex Additive

The latex additive shall be Ultrapave 70 (Anionic) or Ultrapave 1156 (Cationic) or equivalent conforming to the following specifications. It is required that the latex be co-milled at the bulk emulsion facility, to ensure complete and balanced blending. The emulsion manufacturing plant must be open to inspection by the awarding authority.

| | Anionic | Cationic |
|---|---|---|
| Monomer Rate (Butadiene/Styrene) | (76 +/- 2/24 +/- 2) | (76 +/- 2/24 +/- 2) |
| Solids, min % | 67 | 59 |
| Solids, min lbs./gal. | 5.2 | 4.8 |
| Coagulum (80 mesh screen max) | 0.1% | 0.1% |
| pH of Latex | 9.5 – 10.5 | 4.0 – 5.5 |
| Brookfield Visc (Model RVT, #3 spindle @20 RPM) | 800 – 2000 | 5000 max |
| Mechanical Stability | Excellent | Excellent |

c. Treated Stone

Stone shall be crushed quarry stone, free from dust, soft stone or other contaminants, with a minimum of 70% of the stones have a fractured face. All stone shall satisfy a 35% maximum for the L.A. Abrasion Test and a 35% maximum for the Flakiness Index Test. Stone shall be treated prior to application with Liquid Asphalt Material at the rate of 0.2% to 0.5% residual asphalt to ensure uniform treatment of all stones. Proper pre-treatment shall be obtained by a twin shafted Pug mill with a Digital Readout Belt Scale.

**REQUIRED STONE GRADATION**

9.5 mm, (3/8”), STONE

| **SIEVE SIZE** | % PASSING |
|---|---|
| 12.5 mm, (1/2”) | 100 |
| 9.5 mm, (3/8”) | 85 – 100 |

| | |
|---|---|
| 6.3 mm, (1/4") | 10 – 60 |
| 4.75 mm, (#4) | 0 – 25 |
| 2.36 mm, (#8) | 0 - 5 |

Maximum passing 0.075mm, (#200), sieve shall not exceed 2.0%, wet washed, for all sized aggregates used in surface treatments.

**4. MATERIAL QUANTITIES**

The quantity of asphalt material to be used shall be in the range of 1.6 to 2.3 liters per square meter, (0.35 to 0.50 gallons per square yard), or the quantity of MC-3000 to be used shall be in the range of 1.1 to 1.6 liters per square meter, (0.25 to 0.35 gallons per square yard). Cover aggregate shall be spread in the range of 11 to 16 kilograms per square meter, (20 to 30 pounds per square yard). The Contractor will use lab tests to design specific material quantities to meet existing field conditions. Variations in material quantities will be made without adjustment to contract unit price. The Contractor must maintain a laboratory open to the inspection of the awarding agency.

**5. EQUIPMENT**

The equipment used by the Contractor shall include, but not be limited to, one or more of the following:

a. Asphalt Distributor

The asphalt distributor shall contain suitable mechanical circulating and heating mechanisms to provide a uniform approved temperature of the entire mass of material. The distributor shall be equipped with a radar type sensor used to measure ground speed, and feed a Digital Volumetric Accumulator capable of measuring liters applied and distance traveled. It shall be capable of applying asphalt material in accurately measured quantities at any rate between 0.5 to 9.1 liters per square meter, (0.1 to 2.0 gallons per square yard), of roadway surface, at any length of spray bar up to 4.9 meters, (16 feet). The distributor shall be capable of maintaining a uniform rate of distribution of asphalt material regardless of change in grade, width or direction of the road. It shall be equipped with an electronic control for setting asphalt pump discharge rate and on/off switching of spray for nozzles in .3 meter, (one foot), increments which shall be located in the truck cab. The spray nozzles and pressure system shall provide a sufficient and uniform fan-shaped spray of asphalt material throughout the entire length of the spray bar at all times while operating. The spray shall completely cover the roadway surface receiving the treatment.

b. Aggregate Spreader

The aggregate spreader shall be hydrostatically driven and self-propelled. It may be equipped with a hydraulically controlled variable adjustable head that is capable of spreading stone in widths from 1.4 to 5.4 meters, (4.5 to 18 feet). The spreader shall be mounted on pneumatic tires and shall apply the treated stone on the road surface in a manner that ensures that the tires do not contact the road surface until after the stone has been applied. The unit shall be equipped with an electronic radar type sensor used to measure ground speed and will automatically adjust the stone application rate depending on width of application and the speed of chip spreader. It shall have the ability to apply stone on any grade from 0 - 6%. The spreader shall be equipped with an integral hopper with a minimum capacity of 4.5 metric tons, (5 tons), of treated stone which shall be filled by trucks in a manner which ensures that the truck tires never come in contact with asphalt-treated road surfaces until the stone has been properly applied. To maintain constant stone application, a self-locking truck hitch will permit towing of aggregate trucks without stopping the chip spreader. It will capable of maintaining positive engagement over irregular terrain.

c. Rollers

At least one rubber tired and one steel wheeled roller shall be used on each treated surface immediately after the stone has been applied. Each roller shall have a compacting width of not less than 1.5 meters, (5 feet). Each roller shall have a gross weight of not less than 7.2 metric tons, (8 tons), and contact pressure adjustable from 1400 to 2000 kPa, (200 to 300 psi).

d. Trucks

Rear discharge conveyor-fed trucks in sufficient number and size must be used to deliver treated stone to the spreader.

**6. CONSTRUCTION METHODS**

a. Streets to be Treated

The Contractor and the Director shall mutually determine the streets which shall receive treated stone seal treatment. Measurements of streets to be treated shall be made by the Contractor and the Director or his/her Designee, and the Contractor shall prepare a cost estimate for each street prior to beginning work.

b. Surface Preparation

Surface preparation, which may include pothole patching, truing and leveling , adjusting of street irons (valve covers, manhole covers, drop inlet gratings), etc., will be the responsibility of the awarding authority and will be completed before the contractor moves onto the job.

Immediately prior to application of the, the surface shall be thoroughly cleaned by sweeping by the awarding authority. Contractor shall be responsible for covering all utility irons just prior to application and uncovering after aggregate is spread.

c. Weather Limitations

Work will not be done unless the road surface is dry. No work shall be done during rain or foggy periods. No work shall be done if the ambient temperature is below 10°C, (50°F).

d. Spreading Asphalt and Treated Stone

Prior to application of asphalt material on any street, sufficient quantities of materials to cover the entire street at the specified rates shall be on the site and ready for application. The awarding authority shall be responsible for providing the Contractor with an aggregate storage area near the job site. The asphalt material shall not be applied more than 90 meters, (300 feet) in advance of the self-propelled aggregate spreader. AT NO TIME SHALL ANY ASPHALT MATERIAL BE ON ANY ROAD SURFACE FOR MORE THAN FIFTEEN MINUTES BEFORE IT IS COVERED WITH TREATED STONE.

e. Rolling

Initial rolling shall be done immediately following the application of treated stone. Rollers shall be operated at a speed that will not displace aggregate.

f. Traffic Control

Traffic control is the sole responsibility of the awarding authority. Unless otherwise specified, the roadway shall be kept open to traffic at all times, with traffic discontinued on the lane being surface treated. Controlled traffic may be permitted as soon as the final layer is applied and rolled. A recommended maximum speed of 30 km/h, (20 mph), should be maintained for a period of two (2) hours.

g. Surplus Aggregate

Surplus aggregate shall be swept off of the road surfaces by the Highway Department, and shall be the property of the awarding authority. Sweeping will be done after stone seal has properly cured, and care will be taken not to dislodge imbedded aggregate or damage the surface.

**7. PERFORMANCE**

The awarding authority will not award this contract unless the Contractor furnished satisfactory evidence of his/her ability and experience to perform this work, and that he/she has sufficient capital and equipment to enable him/her to prosecute the work successfully and to complete it within the time named in the contract. The Contractor shall not sublet any portion of this contract, and will own all equipment used to complete such contract. As part of the

bid, the Contractor must submit a list of six similar and successfully completed jobs, whose relevance to the proposed job shall be deemed by the awarding authority. The name, address, and telephone number of a contact person involved with each of these projects must be included so they can be investigated prior to the award of the contract. It will be the responsibility of each bidder to visit the job site with the Highway Superintendent. The Board of Selectmen can reject any bid of a contractor who has not visited the work site.

**8. METHOD OF PAYMENT**

Payment for work under this agreement shall be made at the contract unit price per square meter times the number of square meters, measured by the Contractor and the Director or his/her designee, of road surface treated. Price per square meter shall be for complete in place quantities. Upon completion of work, and acceptance by the Director, the Contractor shall submit a payment request to the Director. Payment shall be net thirty (30) days.

**9. GUARANTEE**

Any material or workmanship found to be defective for up to one (1) year from the date of acceptance by the Director shall be replaced by the Contractor at no cost to the awarding authority. Upon notification of defective material or workmanship, the Contractor shall immediately replace such defective areas.
The term Designee shall mean an employee of the awarding authority, designated by the Director.

The term Contractor shall mean a professional company contracted by the awarding authority to perform work under this agreement.

## SPECIFICATIONS FOR STONE SEAL (DOUBLE)

**1. DEFINITIONS**

The term Director shall mean the Highway Surveyor of the awarding authority.

The term Designee shall mean an employee of the awarding authority, designated by the Director.

The term Contractor shall mean a professional company contracted by the awarding authority to perform work under this agreement.

**2. DESCRIPTION**

Work under this contract shall consist of the Contractor furnishing and applying liquid asphalt and stone on properly prepared bituminous streets. Bid quantities are approximate only; payment shall be for actual quantities applied to streets. Streets to be stone sealed shall be selected by the Contractor and the Director or his/her Designee.

**3. MATERIALS**

a. Liquid Asphalt

Liquid asphalt grades shall be: CRS-2 (3% Latex), CMS-2 (3% Latex), RS-2 (3% Latex), HFMS-2 (3% Latex), or MC-3000 conforming to AASHTO specifications M208, M140 or M82.

b. Latex Additive

The latex additive shall be Ultrapave 70 (Anionic) or Ultrapave 1156 (Cationic) or equivalent conforming to the following specifications. It is required that the latex be co-milled at the bulk emulsion facility, to ensure complete and balanced blending. The emulsion manufacturing plant must be open to inspection by the awarding authority.

| | Anionic | Cationic |
|---|---|---|
| Monomer Ratio (Butadiene/Styrene) | (76 +/- 2/24 +/- 2) | (76 +/- 2/24 +/- 2) |

| | | |
|---|---|---|
| Solids, min % | 67 | 59 |
| Solids, min lbs./gal. | 5.2 | 4.8 |
| Coagulum (80 mesh screen) max | 0.1% | 0.1% |
| pH of Latex | 9.5 – 10.5 | 4.0 – 5.5 |
| Brookfield Visc. (Model RVT, #3 spindle @20 RPM) | 800 – 2000 | 5000 max. |
| Mechanical Stability | Excellent | Excellent |

c. Stone

Stone shall be crushed quarry stone, free from dust, soft stone or other contaminants, with a minimum of 70% of the stones have a fractured face. All stone shall satisfy a 35% maximum for the L.A. Abrasion Test and a 35% maximum for the Flakiness Index Test. 9.5 mm, (3/8"), stone shall be treated prior to application with a liquid asphalt material at the rate of 0.2% to 0.5% to ensure uniform treatment of all stones. Proper pre-treatment of 9.5 mm, (3/8"), top course shall be obtained by a twin shafted Pug mill with a Digital Readout Belt Scale.

**REQUIRED STONE GRADATION**

| 12.5 mm, (1/2"), STONE | | 9.5 mm, (3/8"), STONE | |
|---|---|---|---|
| SIEVE SIZE | % PASSING | SIEVE SIZE | % PASSING |
| 15.88 mm, (5/8") | 100 | 12.5 mm, (1/2") | 100 |
| 12.5 mm, (1/2") | 85 – 100 | 9.5 mm, (3/8") | 85 – 100 |
| 9.5 mm, (3/8") | 15 – 45 | 6.3 mm, (1/4") | 10 – 60 |
| 4.75 mm, (#4) | 0 – 10 | 4.75 mm, (#4) | 0 – 25 |
| 2.36 mm, (#8) | 0 – 2 | 2.36 mm, (#8) | 0 - 5 |

Maximum passing 0.075mm, (#200), sieve shall not exceed 2.0%, wet washed, for all sized aggregates used in surface treatments.

**4. MATERIAL QUANTITIES**

The quantity of asphalt emulsion to be used on the double application shall be in the range of 3.2 to 4.1 liters per square meter, (0.70 to 0.90 gallons per square yard), or the quantity of MC-3000 to be used on the double application shall be in the range of 2.5 to 3.4 liters per square meter, (0.55 to 0.75 gallons per square yard). Cover aggregate shall be spread in the range of 30 to 40 kilograms per square meter, (55 to 75 pounds per square yard). The Contractor will use lab tests to design specific material quantities to meet existing field conditions. Variations in material quantities will be made without adjustment to contract unit price. The Contractor must maintain a laboratory open to the inspection of the awarding agency.

**5. EQUIPMENT**

The equipment used by the Contractor shall include, but not be limited to, one or more of the following:

a. Asphalt Distributor

The asphalt distributor shall contain suitable mechanical circulating and heating mechanisms to provide a uniform approved temperature of the entire mass of material. The distributor shall be equipped with a radar type sensor used to measure ground speed, and feed a Digital Volumetric Accumulator capable of measuring liters applied and distance traveled. It shall be capable of applying asphalt material in accurately measured quantities at any rate between .5 to 9.1 liters per square meter, (0.1 to 2.0 gallons per square yard), of roadway surface, at any length of spray bar up to 4.9 meters, (16 feet). The distributor shall be capable of maintaining a uniform rate of distribution of asphalt material regardless of change in grade, width or direction of the road. It shall be equipped with an electronic control for setting asphalt pump discharge rate and on/off switching of spray nozzles in .3 meter, (one foot), increments which shall be located in the truck cab. The spray nozzles and pressure system shall provide a sufficient and uniform fan-shaped spray of asphalt material throughout the entire length of the spray bar at all times while operating. The spray shall completely cover the roadway surface receiving the treatment.

b. Aggregate Spreader

The aggregate spreader shall be hydrostatically driven and self-propelled. It may be equipped with a hydraulically controlled variable adjustable head that is capable of spreading stone in widths from 1.4 to 5.4 meters, (4.5 to 18 feet). The spreader shall be mounted on pneumatic tires, and shall apply the stone on the road surface in a manner that ensures that the tires do not contact the road surface until after the stone has been applied. The unit shall be equipped with an electronic radar type sensor used to measure ground speed and will automatically adjust the stone application rate depending on width of application and the speed of chip spreader. It shall have the ability to apply stone on any grade from 0 - 6%. The spreader shall be equipped with an integral hopper with a minimum capacity of 4.5 metric tons, (5 tons), of stone which shall be filled by trucks in a manner which ensures that the truck tires never come in contact with asphalt-treated road surfaces until the stone has been properly applied. To maintain constant stone application, a self-locking truck hitch will permit towing of aggregate trucks without stopping the chip spreader. It will be capable of maintaining positive engagement over irregular terrain.

c. Rollers

At least one rubber tired and one steel wheeled roller shall be used on each treated surface immediately after the stone has been applied. Each roller shall have a compacting width of not less than 1.5 meters, (5 feet). Each roller shall have a gross weight of not less than 7.2 metric tons, (8 tons), and contact pressure adjustable from 1400 to 2000 kPa, (200 to 300 psi).

d. Trucks

Rear discharge conveyor-fed trucks in sufficient number and size must be used to deliver stone to the spreader.

## 6. CONSTRUCTION METHODS

a. Streets to be Treated

The Contractor and the Director shall mutually determine the streets which shall receive treated stone seal treatment. Measurements of streets to be treated shall be made by the Contractor and the Director or his/her Designee, and the Contractor shall prepare a cost estimate for each street prior to beginning work.

b. Surface Preparation

Surface preparation, which may include pothole patching, truing and leveling , adjusting of street irons (valve covers, manhole covers, drop inlet gratings), etc., will be the responsibility of the awarding authority and will be completed before the contractor moves onto the job.

Immediately prior to application, the surface shall be thoroughly cleaned by sweeping by the awarding authority. Contractor shall be responsible for covering all utility irons just prior to application and uncovering after aggregate is spread.

c. Weather Limitations

Work will not be done unless the road surface is dry. No work shall be done during rain or foggy periods. No work shall be done if the ambient temperature is below 10°C, (50°F).

d. Spreading Asphalt And Treated Stone

Prior to application of asphalt material on any street, sufficient quantities of materials to cover the entire street at the specified rates shall be on the site and ready for application. The awarding authority shall be responsible for providing the Contractor with an aggregate storage area near the job site. The asphalt material shall not be applied more than 90 meters, (300 feet), in advance of the self-propelled aggregate spreader. AT NO TIME SHALL ANY ASPHALT MATERIAL BE ON ANY ROAD SURFACE FOR MORE THAN FIFTEEN MINUTES BEFORE IT IS COVERED WITH TREATED STONE.

e. Rolling

Initial rolling shall be done immediately following the application of treated stone. Rollers shall be operated at a speed that will not displace aggregate.

f. Traffic Control

Traffic control is the sole responsibility of the awarding authority. Unless otherwise specified, the roadway shall be kept open to traffic at all times, with traffic discontinued on the lane being surface treated. Controlled traffic may be permitted as soon as the final layer is applied and rolled. A recommended maximum speed of 30 km/h, (20 mph), should be maintained for a period of two (2) hours.

g. Surplus Aggregate

Surplus aggregate shall be swept off of the road surfaces by the Highway Department, and shall be the property of the awarding authority. Sweeping will be done after stone seal has properly cured, and care will be taken not to dislodge imbedded aggregate or damage the surface.

**7. PERFORMANCE**

The awarding authority will not award this contract unless the Contractor furnished satisfactory evidence of his/her ability and experience to perform this work, and that he/she has sufficient capital and equipment to enable him/her to prosecute the work successfully and to complete it within the time named in the contract. The Contractor shall not sublet any portion of this contract, and will own all equipment used to complete such contract. As part of the bid, the Contractor must submit a list of six similar and successfully completed jobs, whose relevance to the proposed job shall be deemed by the awarding authority. The name, address, and telephone number of a contact person involved with each of these projects must be included so they can be investigated prior to the award of the contract. It will be the responsibility of each bidder to visit the job site with the Highway Superintendent. The Board of Selectmen can reject any bid of a contractor who has not visited the work site.

**8. METHOD OF PAYMENT**

Payment for work under this agreement shall be made at the contract unit price per square meter times the number of square meters, measured by the Contractor and the Director or his/her designee, of road surface treated. Price per square meter shall be for complete in place quantities. Upon completion of work, and acceptance by the Director, the Contractor shall submit a payment request to the Director. Payment shall be net thirty (30) days.

**9. GUARANTEE**

Any material or workmanship found to be defective for up to one (1) year from the date of acceptance by the Director shall be replaced by the Contractor at no cost to the awarding authority. Upon notification of defective material or workmanship, the Contractor shall immediately replace such defective areas.

**SPECIFICATIONS FOR ASPHALT-RUBBER SURFACE TREATMENT WITH AGGREGATE COVER**

**STRESS ABSORBING MEMBRANE - SAM**
**STRESS ABSORBING MEMBRANE INTERLAYER - SAMI**
**0395**

This specification covers requirements for materials, manufacture, and application of asphalt-rubber as a stress absorbing membrane (SAM) or a stress absorbing membrane interlayer (SAMI). This specification shall consist of an application of a combined reacted mixture of hot paving grade asphalt and ground rubber followed immediately with a cover material.

**1.0 BASE MATERIALS**

1.1 Asphalt Cement

Asphalt cement for the asphalt-rubber mixture shall be PG 58-28 OR PG 64-28, complying with the requirements of appropriate state or local specifications. The grade selected shall be based on laboratory testing by the asphalt-rubber supplier.

1.2 Anti-stripping Agent

If required by the job-mix formula to produce appropriate water resistance, an anti-stripping agent that is heat stable and approved for use by the Agency shall be incorporated into the asphalt-rubber material at the dosage required by the job-mix formula (up to 1.0% by weight of asphalt). It shall be added to the asphalt cement prior to blending with the granulated rubber.

1.3 Rubber

The granulated rubber shall be vulcanized rubber product from the ambient temperature processing of scrap, pneumatic tires. The granulated rubber shall meet the following gradations: No substitutions will be accepted.

| Sieve Size | % Passing |
|---|---|
| 2.00 mm, (#10) | 100 |
| 1.18 mm, (#16) | 90 – 100 |
| 0.60 mm, (#30) | 25 – 75 |
| 0.18 mm, (#80) | 0 - 20 |

The use of rubber of multiple types from multiple sources is acceptable provided that the overall blend of rubber meets the gradation requirements. The length of the individual rubber particles shall not exceed 3 mm, (1/8”). The rubber shall be accepted by certification from the rubber supplier.

1.4 Aggregate

The aggregate shall conform to the requirement of appropriate state or local specifications for crushed stone. Crushed gravel stone will not be permitted. Percentage of wear as determined by the Los Angeles Abrasion Test (AASHTO-T96) shall be a maximum of 30. The aggregate shall be pre-heated to a temperature between 93°C and 149°C, (200°F and 300°F), and be pre-coated with 0.4% to 0.8% (by weight of aggregate) of AC-10 or AC-20 asphalt cement prior to application. It is recommended that the gradation of the aggregate meet the following limits:

| Sieve Size | % Passing – Nominal Size | |
|---|---|---|
| | 9.5 mm, (3/8”) | 12.5 mm, (1/2”) |
| 15.8 mm, (5/8”) | 100% | 100% |
| 12.5 mm, (1/2”) | 100% | 85 – 100% |
| 9.5 mm, (3/8” | 85 – 100% | 15 – 45% |
| 4.75 mm, (#4) | 0 – 25% | 0 – 15% |
| 2.36 mm, (#8) | 0 – 5% | 0 – 5% |
| 0.30 mm, (#50) | 0 – 2% | 0 – 2% |
| 0.075 mm, (#200) | 0 – 2% | 0 – 2% |

1.5 Materials Testing

A minimum of 60 days prior to construction the Agency or contractor (if asphalt-rubber supplier is acting as a sub-contractor) shall send a representative sample of the asphalt cement and the aggregate proposed for use to the asphalt-rubber supplier for testing. Testing for stripping and asphalt content to determine and assure that appropriate characteristics are achieved when blended with the granulated rubber will be performed.

## 2.0 ASPHALT-RUBBER MIXING AND REACTION

### 2.1 Mixing and Reaction

The percent of rubber shall be 20 +/- 3% as indicated by the mixture design for specific project requirements by weight of total mixture, that is, by total weight of asphalt cement, plus granulated rubber. The exact granulated rubber content shall be determined by the mix design submitted by the asphalt-rubber supplier based on laboratory testing.

The temperature of the asphalt shall be between 177°C and 218°C, (350°F and 425°F), at the time of addition of the granulated reclaimed rubber. The asphalt and rubber shall be combined and mixed together in a blender unit and reacted in the distributor for a period of time as required by the mix design. The temperature of the asphalt-rubber mixture shall be above 163°C, (325°F), during the reaction period.

### 2.2 Delays

When a job delay occurs after full reaction, the asphalt-rubber may be allowed to cool. The asphalt-rubber shall be reheated slowly just prior to application, but not to a temperature exceeding 191°C, (375°F). An additional quantity of granulated rubber or additive not exceeding 3% by volume of the hot asphalt-rubber mixture may be added after reheating.

### 2.3 Viscosity

Viscosities shall be run, by the asphalt-rubber supplier, on each blended load of asphalt-rubber using a Haake-type field viscometer. The viscosity of the final product shall be in the range of 1,000 to 3,500 centipoise.

## 3.0 EQUIPMENT

### 3.1 Mechanical Blender

A mechanical blender for proper proportioning and thorough mixing of the asphalt-cement and granulated rubber is required. This unit shall be equipped with: an asphalt totaling meter (liters or gallons); a flow rate meter (liters per minute or gallons per minute); a positive displacement auger to feed the rubber properly to mixing chamber at the specified rate; and a static motionless mixer. Blender will have a separate rate; and a static motionless mixer. Blender will have a separate asphalt cement feed pump and finished product pump to maximize production. Blender shall be capable of providing 100% proportional mix at any given time during the blending cycle and documentation from the manufacturer, supporting this, shall be submitted to the awarding authority if requested.

### 3.2 Distributor Truck

On projects exceeding 31.8 metric tons, (35 tons), of liquid asphalt rubber, at least two pressure-type bituminous distributor trucks in good condition will be required. The distributor shall be equipped with an internal heating device capable of heating the material evenly up to 218°C, (425° F); an internal mixing unit capable of maintaining a proper mixture of asphalt cement and granulated rubber; have adequate pump capacity to maintain a high rate of circulation in the tank and to spray the asphalt-rubber at a viscosity of 1,000 to 3,500 centipoise; have adequate pressure devices and suitable manifolds to provide constant positive cut-off to prevent dripping from the nozzles. Distributor shall be equipped with an electronically controlled computerized compensation unit for controlling application rates at various width and speed changes. The application unit shall have electronic controls and a digital read out installed and operated from the inside of the cab of the distributor. The distribution bar on the distributor shall be fully circulating. Any distributor that produces a streaked or irregular distribution of the material shall be promptly repaired or removed from the project.

Distributor equipment shall include a tachometer, pressure gauges, volume measuring devices, and a thermometer for reading temperature of tank contents. Controls for spray bar shall be located in cab of truck, for controlling width and rate of spray of product. It shall be so constructed that uniform

applications may be made at the specified rate per square meter with a tolerance of plus or minus 0.2 liters per square meter, (0.05 gal. / sq. yd).

A "bootman" shall accompany the distributor and ride in a position so that all spray bar nozzles are in his full view and readily accessible for unplugging.

3.3 Hauling Equipment

Trucks for hauling cover material shall be rear discharge conveyor-fed or "live bottom" trucks and shall be equipped with a device to lock onto the hitch at the rear of the chip spreader to prevent aggregate spillage.

Sufficient hauling vehicles will be available to ensure continuous operation of the distributor and chip spreader.

3.4 Aggregate Spreader

The aggregate spreader shall be hydrostatically driven and self propelled. It must be equipped with a hydraulically controlled variable adjustable head that is capable of spreading stone in widths from 1.4 to 5.4 meters, (4.5 to 18 feet). The spreader shall be mounted on pneumatic tires, and shall apply the stone on the road surface in a manner that ensures that the tires do not contact the road surface until after the stone has been applied. The unit

shall be equipped with an electronic radar type sensor used to measure ground speed and will automatically adjust the stone application rate depending on width of application and the speed of chip spreader. It shall have the ability to apply stone on any grade from 0 - 6%. The spreader shall be equipped with an integral hopper with a minimum capacity of 4.5 metric tons, (5 tons), of stone which shall be filled by trucks in a manner which ensures that the truck tires never come in contact with asphalt treated road surfaces until the stone has been properly applied. To maintain constant stone application, a self-locking truck hitch will permit towing of aggregate trucks without stopping the chip spreader. It will be capable of maintaining positive engagement over irregular terrain.

3.5 Pneumatic-Tired Roller

Two (2) self-propelled, multiple wheel, pneumatic-tired rollers shall be used and shall weigh between 6.5 and 10.9 metric tons, (7 and 12 tons), each roller shall have a total compacting width of at least 1.4 meters, (56 inches), have a minimum tire pressure of 414 kPa, (60 psi), and be equipped with a watering system.

3.6 Steel-Wheel Roller

One (1) self-propelled, 2-axle (tandem) steel-wheel roller shall be used and shall weigh between 7.3 and 10.9 metric tons, (8 and 12 tons), and be equipped with scrapers, wetting pads and watering system. Combination pneumatic and steel drum-type rollers are acceptable, as one unit only.

**4.0 CONSTRUCTION PROCEDURES**

4.1 Preparation

Potholes, other areas of pavement failure, and major depressions in the existing pavement surface shall be repaired by the owner with asphalt concrete. A leveling course shall be placed on planed, milled or existing surface by the owner, if required.

Immediately prior to application of the asphalt-rubber, the surface shall be thoroughly cleaned by sweeping. Contractor shall be responsible for covering all utility irons just prior to application and uncovering after aggregate is spread.

4.2 Seasonal and Weather Limitations

The asphalt-rubber shall not be applied when weather conditions are unfavorable to obtaining a uniform spread. Construction shall proceed only when the atmospheric temperature is at least 10°C, (50°F), and rising. No water shall be present on the road surface.

4.3 Application

The asphalt-rubber mixture shall be applied at a temperature of 170° to 215°C, (338°F to 419°F), at a rate of 2.5 to 2.9 liters per square meter, (0.55 to 0.65 gallons per square yard). Exact rate to be determined by the aggregate gradation, traffic volume and pavement condition.

Longitude joints shall be reasonably true to line and parallel to centerline. Where any construction joint occurs, the edges shall be broomed back and blended so there are no gaps and the elevations are the same, and free from ridges and depressions. Longitudinal joints shall be overlapped from 10.2 to 15.2 centimeters, (4 to 6 inches).

During application, adequate provision shall be made to prevent marring and discoloration of adjacent pavements, structures, vehicles, foliage or personal property.

4.4 Aggregate Application

The application of aggregate shall follow as close as possible behind the application of the hot asphalt-rubber which shall not be spread further in advance of the aggregate spread that can be immediately covered. Construction equipment or other vehicles shall not drive on the uncovered asphalt-rubber. The hot pre-coated aggregate shall be spread uniformly by a self-propelled spreader at a rate of spread directed by the Agency, generally between 16.3 to 21.7 kilograms per square meter, (30 to 40 pounds per square yard). Any deficient areas shall be covered with additional material.

4.5 Rolling

A minimum of three (3) rollers shall be used for aggregate compaction into the hot asphalt-rubber. Two rollers must be pneumatic-tired and one must be steel-wheel. Rolling shall commence immediately following spread of aggregate. There shall be at least three coverage's by the pneumatic-tired rollers to embed the aggregate particles firmly into the asphalt-rubber. A coverage shall be as many passes as are necessary to cover the entire width being spread with a pass being one movement of a roller in either direction. Additional coverage of the steel-wheel roller will follow. Water shall be applied to the tires or wheels as required to limit sticking of the asphalt-rubber and aggregate to the rollers.

4.6 Sweeping

When the maximum amount of aggregate has been embedded into the asphalt-rubber and the pavement has cooled, all loose material shall be swept or otherwise removed. This will be done at a time and in a manner which, will not displace any embedded aggregate or damage the asphalt-rubber. Pre and post sweeping is the responsibility of the owner unless bid as a separate bid item.

**5.0 METHOD OF MEASUREMENT AND BASIS OF PAYMENT**

5.1 SAM OR SAMI

Stress Absorbing Membrane or Stress Absorbing Membrane Interlayer will be measured by the square meter / square yard and shall be the actual number of square meters / square yards applied. Price per square meter / square yard shall be full compensation for all labor, materials and equipment required to complete the work in accordance with these specifications.

5.2 Other Work

Measurement of and payment for other work such as patching, leveling, sweeping and crack sealing shall be bid as separate item(s).

# BID FORM

**Note to bidders:** In order to more effectively manage its projects the town has determined that bituminous concrete and cold planning will be awarded as one. The low bidder will be determined by calculating the total anticipated cost of the project.

| | APPROX. QUANTITY | AT PLANT | DELIVERED |
|---|---|---|---|
| **Winter sand** | 1,500 tons | | |
| **Highway salt** | 1,500 tons | | |
| **Road striping (pavement marking) in compliance with current standards in *Mass. Manual on Uniform Traffic Control Devices*** | 25 miles | | |
| **Crack sealing** | 10,000 gallons | | |
| **Bituminous concrete, in place, various locations** | 1,500 tons | XXXXX | |
| **Cold planing to 1½ and 2 inches with cleanup and disposal of materials** | 10,000 yd² | | |
| **Cold patch** | 125 tons | | |

## Stone Seals Bids

**PRICE ADJUSTMENT.** A fluctuating price will be required for this bid to allow for price adjustments based on the period price of asphalt cement posted by the Mass. Highway Department. The price adjustment will be based on the variance in price for the asphalt cement component only from the Base Price to the Current Period Price, NEW METHOD, as posted on the Mass. Highway Website: www.mass.gov/ (Type in asphalt prices in search box.)

**Single Stone Seal:** Current Price minus Base Price divide by 238 (Gal. in ton emulsion) x .66 (asphalt in Gal. emulsion) x .42 Gal. / SY (application rate) =Adjustment per square yard.

**Double Stone Seal:** Current Price minus Base Price divide by 238 (Gal. in ton emulsion) x .66 (asphalt in Gal. emulsion) x .80 Gal. / SY (application rate) =Adjustment per square yard.

**20% Asphalt Rubber Surface Treatment:** Current Price minus Base Price divide by 235 (Gal. Asphalt in ton) x .8 (Asphalt minus rubber content) x .60 Gal. / SY (application rate) = Adjustment per square yard.

| **Base price for this bid per ton of asphalt cement will be:** | |
|---|---|

| | APPROXIMATE QUANTITY | PRICE |
|---|---|---|
| **Treated Stone Seal** applied to town prepared roadways in accordance with the attached specifications. | 50,000 square yards | |
| **Double Stone Seal** applied to town prepared roadways in accordance with the attached specifications. | 10,000 square yards | |
| **20% Asphalt-Rubber Surface Treatment** applied to town prepared roadways in accordance with the attached specifications. | As needed<br>Per square yard | |
| **Shimming / Leveling.** Contractor shall provide all necessary shimming and leveling to the roadways prior to the above surface treatments. The price per ton shall include the cost of a distributor | 500 tons | |

| | | |
|---|---|---|
| truck and the emulsion to tack the road prior to shimming. Minimum quantity of 250 Tons per day. | | |
| At the awarding authority's option, post sweeping of the roadways for 20% asphalt-rubber surface treatments will be an additional charge of | Per square yard | |

The undersigned agrees to furnish materials/services at prices quoted herein:

COMPANY: _____

ADDRESS: _____

_____

By: _____
(Signature) (Title)

NAME (Printed): _____ PHONE: _____ DATE: ___/___/13

FULL ADDRESS: _____

**Certificate of Non-Collusion**
**TO: TOWN OF FREETOWN, MASSACHUSETTS**

The undersigned certifies under penalties of perjury that this bid is in all respects bona fide, fair, and made without collusion or fraud with any other person. As used in this paragraph the word "person'' shall mean any natural person, joint venture, partnership, corporation, or other business or legal entity.

_____ _____
Signature of person signing bid or proposal Printed Name, Title

_____ _____
Company Name Date

**Certificate of Payment of Taxes**
**TO: TOWN OF FREETOWN, MASSACHUSETTS**

The undersigned officer of _____ (the Company) does hereby certify to the best of his knowledge, information, and belief that all federal and state taxes that are the obligation of the Company and that are due and payable for the current year or for any prior years, have been paid in full.

COMPANY NAME: _____

By: _____ _____ / _____ / 2013
Signature Month Date

_____
Printed name, title

**Hold Harmless Statement**
**TO: TOWN OF FREETOWN, MASSACHUSETTS**

_____ (the Company) shall indemnify and hold harmless the Town of Freetown and its officers, agents, servants, and employees from and against any and all claims, demands, suits, proceedings, liabilities, judgements, awards, losses, damages, costs, and expenses, including attorneys' fees, on account of bodily injury or death sustained by any person or persons or injury or damage to or destruction of property, arising solely and directly out of the work performed by the Company, if due or claimed to be due solely to the negligence or fault of the Company, its officers, agents, servants, or employees; provided, however, that the Company, shall not be required to indemnify the Town of Freetown or its officers, agents, servants, or employees, against any such damages or claims occasioned by defects in its plans, drawings, designs, or specifications; and provided further that the Company shall not be required to indemnify the Town of Freetown or its officers, agents, servants, or employees, against such damages occasioned in whole or in party by acts or omissions of the Town of Freetown, or any party other than the Company.

COMPANY NAME: _____

By: _____ _____ / _____ / 2013
Signature Month Date

_____
Printed name, title